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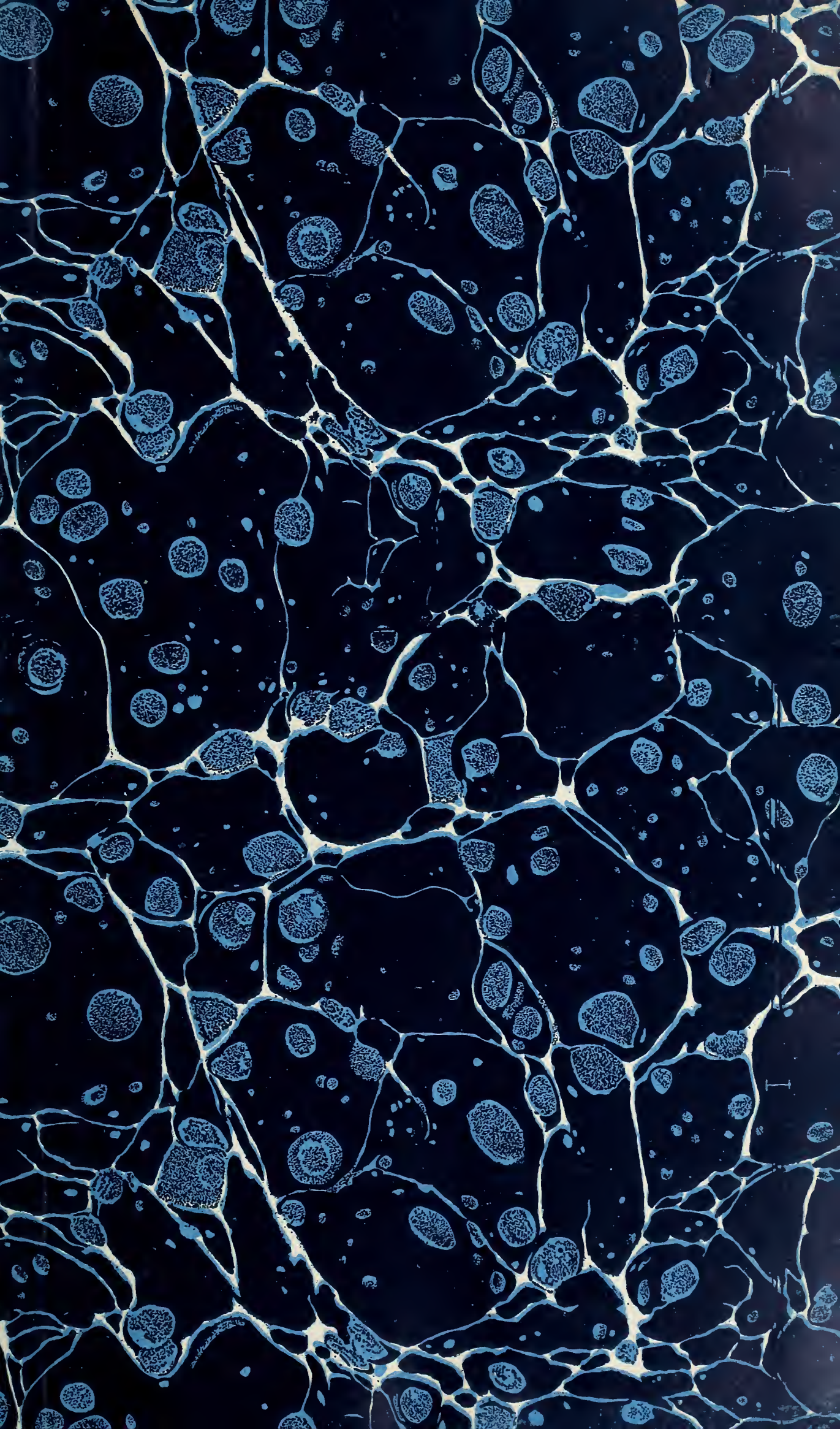

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THE TATTOO METHOD OF MARKING HOGS AND ITS USE

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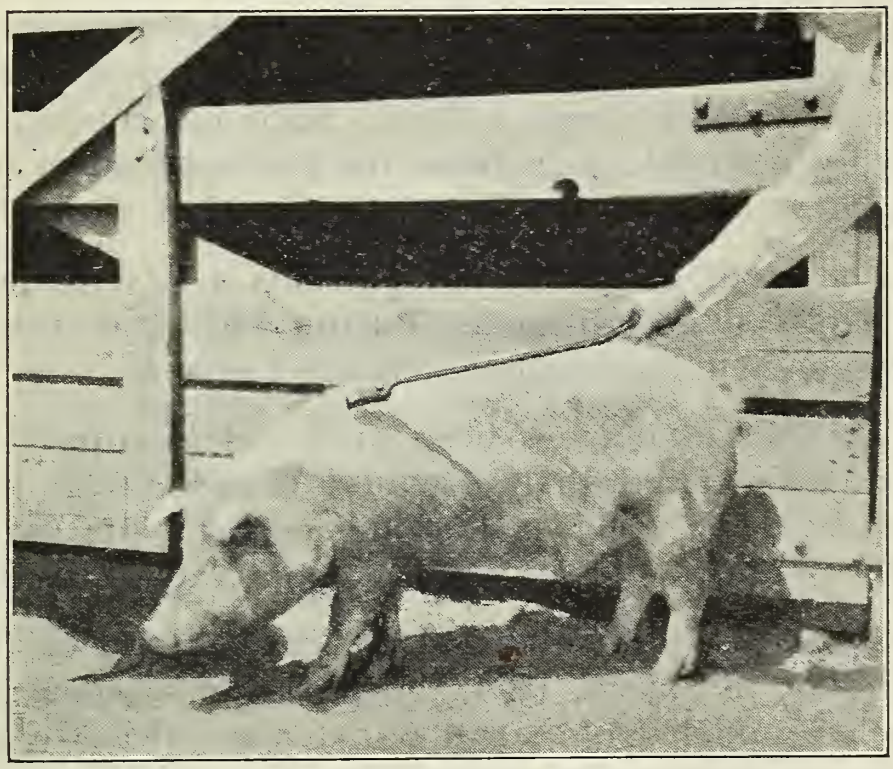
By F. E. MURRAY, Associate Veterinarian
Bureau of Animal Industry



TATTOOING A HOG
ONE STROKE OF THE INSTRUMENT APPLIES THE MARK

UNITED STATES
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WASHINGTON
1929

DEVELOPMENTS in livestock sanitary work have shown the increasing importance of detecting the origin of diseased conditions among animals and the channels through which infection spreads. The tattoo method of marking hogs is a practical means of identification and control of diseases.

The method is simple, inexpensive, and easily used. It is a definite means of preserving the identity of hogs between farm and market. In the field of cooperative marketing, where shipments include numerous small lots of animals, the tattoo mark is particularly useful, because of its conclusive evidence of every hog's origin. Such information is highly desirable as a basis for payment when diseased conditions appear at the time of slaughter.

The method described represents a development of more than eight years, during which no serious objections to the tattoo system have arisen.

This discussion has been prepared to supply information called for by frequent requests from persons who have learned of the experimental work with the tattoo device and who contemplate its use.

Since the publication of the first edition of this circular, in March, 1926, the tattooing of hogs has been conducted on a rather extensive scale in the vicinity of several markets in the Central West, and has resulted in a number of improvements and refinements in methods, which are embodied in the present edition.

Washington, D. C. February, 1929

THE TATTOO METHOD OF MARKING HOGS AND ITS USE

By F. E. MURRAY, Associate Veterinarian, Bureau of Animal Industry[1]

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VALUE OF A MEANS FOR IDENTIFYING HOGS

In the systematic handling of livestock and the control of animal diseases, occasion frequently arises to trace the origin of certain animals after slaughter. This is especially important when post-mortem examination reveals the presence of an infectious disease or other serious condition. The magnitude of the swine industry in the United States and the serious diseases to which swine are subject make a system of identification for this class of stock especially desirable.

Furthermore, current developments in the eradication of tuberculosis from livestock point out the susceptibility of swine to the forms of this disease affecting cattle and fowls. Hence any means for detecting the origin of diseased conditions and the channels through which infection spreads are a distinct benefit to the livestock industry. The principles of identifying property of all kinds are so well known that the application of a suitable method for marking hogs indelibly is nothing unusual or so novel as to require detailed discussion of its value. Rather, the tattoo method here described is but the adaptation of an age-old system for marking the human body. A tattoo mark properly applied resists all attempts to remove it and, after death, is as permanent as the skin itself.

The structure of a hog's skin makes it well adapted for tattooing; nor does the hair or scurf interfere with the rapid application of the tattoo mark. The instrument described does not, however, leave a mark that can be discerned satisfactorily on living hogs. For live hogs the customary ear tag or system of ear notches is a preferred means of identification. The chief value of the tattoo method of marking hogs is the ability to identify the dressed carcasses of hogs so marked. Four months before slaughter is as long a time as the writer has had occasion to mark hogs with the view of observing the durability of the tattoo. In that case the mark was plainly visible on the dressed carcasses. The tattoo device is considered unsuitable for marking classes of livestock other than hogs, because of the different nature of their skins and surface coverings.

[1] Acknowledgment is made of valuable information furnished by R. L. Cuff, livestock commissioner, Kansas City Livestock Exchange; Dr. Elmer Lash, Tuberculosis Eradication Division of the bureau; E. Z. Russell, in charge of the bureau's swine office; and others.

DESCRIPTION OF TATTOO DEVICE

The instrument used for tattooing hogs consists of a metal holder slotted to receive Babbitt-metal blocks, three-fourths inch by 1 inch, in which the tattooing points are set. The points are ordinary steel phonograph needles. The length of these needles is about five-eighths inch, of which three-eighths is embedded in molten Babbitt metal, allowing the pointed tips to extend the remaining two-eighths inch. The needles used are of the medium-heavy rather than slender form; from a music standpoint they are known as the medium-tone type (or No. 2 needle), a convenient means of identifying the kind considered to be best suited for tattooing purposes. A slender needle bends too easily. Experience has shown that the tattoo mark is somewhat plainer if the needle points are blunted very slightly and also roughened along the sides. Such points carry more pigment into the skin than points that are perfectly smooth.

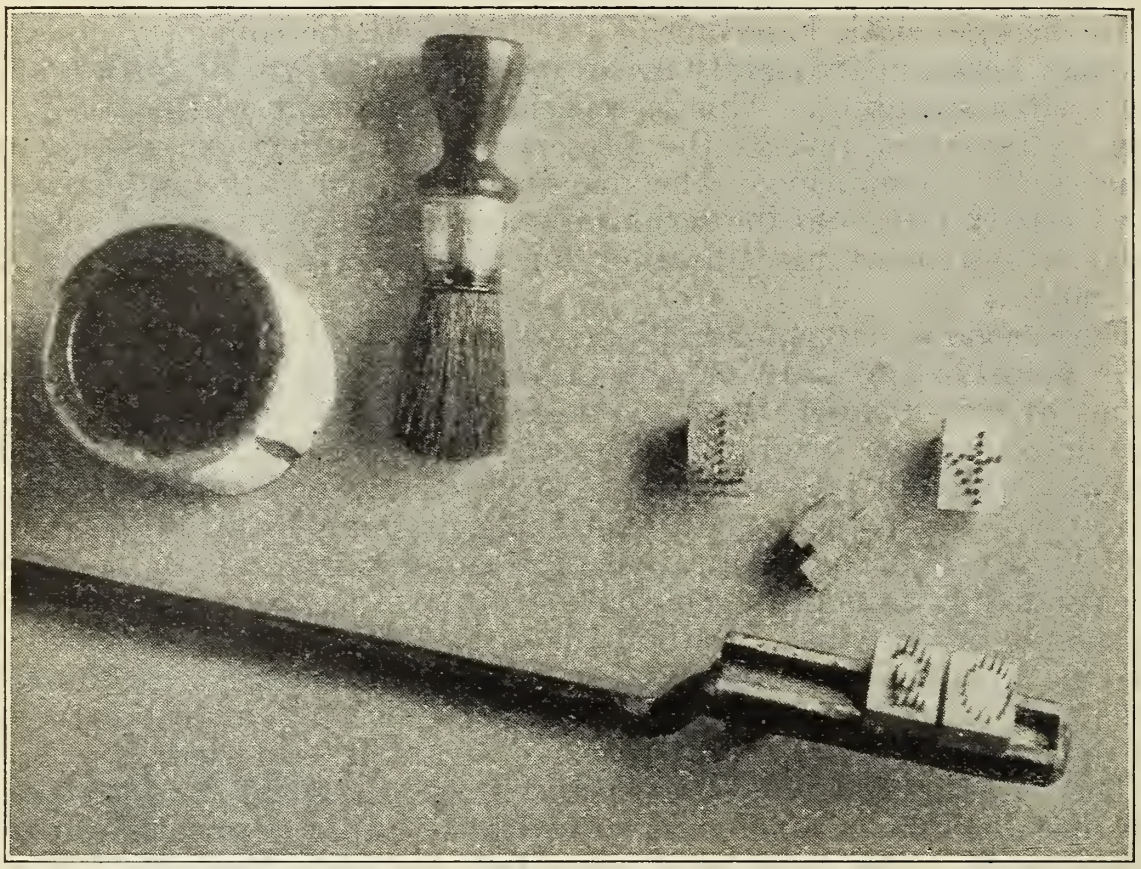

FIG. 1.—Equipment used in tattooing hogs, including holder, Babbitt-metal blocks in which steel points are set, can of black marking fluid, and brush

The needles are set in the metal blocks in the form of numbers and letters, the points of the needles being about an eighth of an inch apart. Most of the individual characters used require from 10 to 18 needles. Shoulders on the metal blocks fit the grooved holder, the extreme end of which is closed. A thumbscrew, or set screw, or similar device, holds in place the last block inserted. The portion of the holder that receives the blocks is 4 inches long, which provides room for five blocks, each three-fourths inch wide. Since numbers as large as five figures are seldom needed, it is desirable to provide several blank blocks—that is, blocks in which no needles have been set. These are useful in giving the necessary weight. The tattoo instrument is about 18 inches long and, with the five blocks in place, ready

for use, weighs 2 pounds. The handle of the instrument is made from a ⅜-inch steel rod. Figures 1 and 2 show the general construction and appearance of the holder and blocks.

PERMANENCE OF THE TATTOO

Early experiments conducted by the writer, by J. E. Gibson, inspector in charge of the bureau's work on hog-cholera control and tuberculosis eradication in Indiana, and also by T. S. Rich, bureau inspector in charge of tuberculosis eradication in Michigan, included many different pigments. The State chemist of Michigan also assisted in the experimental work to determine the best material for tattoo purposes. Results have varied, apparently because of varying methods of handling hogs in packing houses. A paste compound of equal parts of lampblack and graphite mixed with a sufficient quantity of cottonseed oil to form a thick paste was first used. This paste, applied to the points of the tattoo instrument, produced figures and letters which were plainly visible on the carcasses dressed in western packing houses and remained in the skin of hogs indefinitely. But the same pigment did not prove to be so durable in the case of hogs slaughtered at Buffalo. When hogs were marked two weeks before slaughter the results were unsatisfactory, though the letters and figures were plainly visible when the same mixture was used for marking hogs within 36 hours of the time of slaughter.

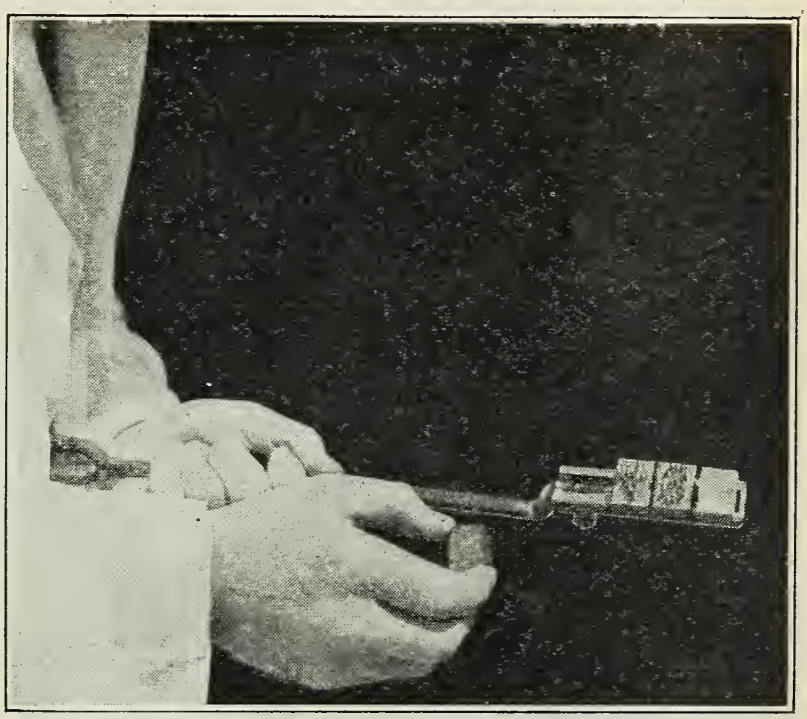

FIG. 2.—Inserting the tattoo blocks in slotted end of instrument. A thumbscrew holds the last block in place. Some blocks contain figures and letters; others are blank

The rigorous treatment which a hog carcass undergoes first in the hot water of the scalding vat and later under the mechanical beaters used for removing the hair, probably explains variations in results obtained with the same pigments under different conditions of hog slaughter. Experiments with an aqueous suspension of the lead of indelible pencils gave negative results.

The use of automobile enamel as a pigment has given good results in some cases, but has not been satisfactory in others. This is probably explained by the varying composition of the product as made by different manufacturers. Moreover, the use of enamel requires the prompt cleaning of brushes to prevent their becoming hard and stiff. For these reasons the former use of black enamel has been

largely discontinued in favor of other products of more uniform composition that leave brushes more pliable.

Another marking fluid that was used during later experimental work consists of the following formula: 1 ounce of lampblack, 2 ounces of glycerin, and 4 ounces of water. Practical experience, however, in tattooing a large number of hogs showed that the lampblack settled to the bottom of the container, leaving but little pigment in the upper portion of the mixture. In such cases the mixture proved to be too thin to give clear tattoo marks. Experience also showed that the operator's clothes were more likely to become soiled when the tattooing fluid of thin body consistence was used. The foregoing products and formulas that were not fully satisfactory are mentioned for the benefit of persons who are interested in the perfection of tattooing fluids.

The experience of bureau inspectors engaged in tuberculosis eradication and also numerous experiments conducted by R. L. Cuff, livestock commissioner of the Kansas City Livestock Exchange, shows that a sirup-like mixture of common cylinder oil and lampblack makes a good marking material. The ingredients are easily obtained and are inexpensive. The marking material, however, now in use at the Kansas City market, where a great deal of tattooing is done, consists of lampblack, ground or mixed to a thick sirupy consistence in linseed oil. This product has given the most uniformly good results. One ounce of lampblack and 1½ ounces of linseed oil, raw preferred, produce a mixture of very workable consistence. It has the additional merit of being easily washed from the operator's hands. Lampblack is nearly pure powdered carbon and is insoluble in the hog's system. Any soluble marking material, on the other hand, will be carried away by the circulation and not produce permanent marks.

FIG. 3.—Applying pigment to the marker

Any style of brush may be used for applying the marking fluid to the tattoo points. (See fig. 3.) A common, round stencil brush, having a tuft of bristles about an inch in diameter, is especially satisfactory. A large shaving brush with rather stiff bristles also is suitable for the work, but the style of brush is largely a matter of personal taste. The pigment is applied with the end of the brush, so that the needles are coated their entire length. Merely brushing the points is less satisfactory.

It is important to use plenty of the marking material when several weeks or more are to elapse between the time of tattooing the hogs and slaughtering them. A half-pint can of the marking material will tattoo approximately 100 hogs.

Although the work is expedited somewhat when the operator has an assistant to apply the pigment to the marker, very good results may be obtained by one man. When the work is conducted by one man he holds a round, stencil brush with coarse bristles filled with pigment in his left hand and applies the brush to the needles after each slap of the instrument.

Tattooing is neither a difficult nor a lengthy operation. A carload of hogs can be marked in from three to five minutes by one man with a pigment-saturated brush in one hand and a tattoo instrument in the other. The hogs are driven through a gate which is partly opened, or through a narrow chute not more than 20 inches in width, the operator striking them from behind. In such narrow places hogs can

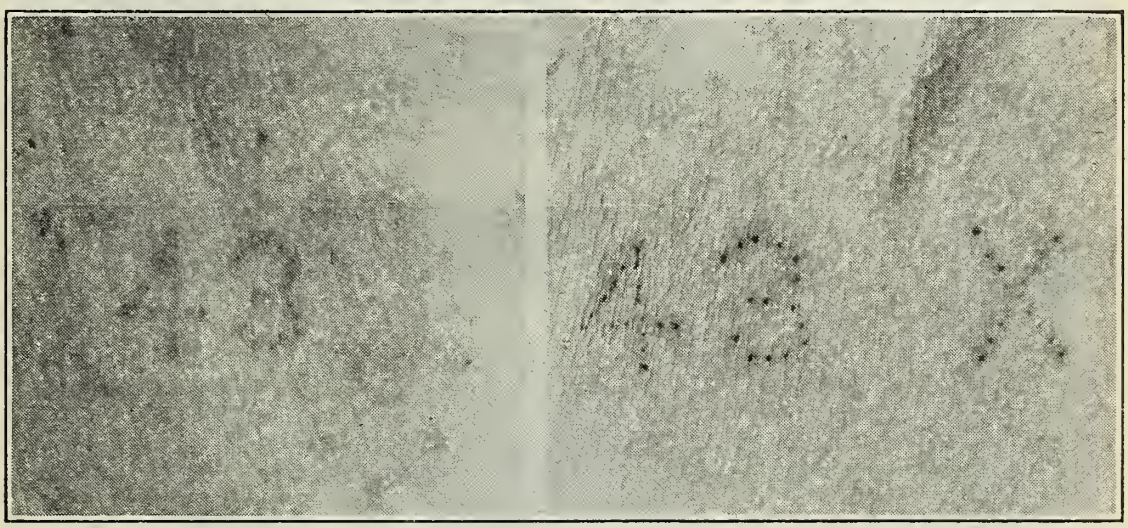

FIG. 4.—A comparison of the legibility of tattoo marks made (at left) with the bare points of the marker, no pigment being used, and (at right) with black pigment. When no pigment is used the mark is pink. These pictures were made of freshly dressed carcasses 26 hours after tattooing. The use of pigment is advised as a regular practice because of the greater clearness of the marks

not go faster than a walk. Some shippers tattoo hogs on the scales or in unloading chutes. One man can mark a drove of hogs as quickly as they can be driven through a chute.

In the course of experimental work Doctor Rich found that animals tattooed without any pigment whatever would show legible markings, if slaughtered within a few hours. The writer also has obtained good results by using merely the bare points. (Fig. 4.) The tattoo marks in such cases were a pink color, due to slight capillary hemorrhages.

Tattooing without pigment is not advised, however, as a regular practice since delay in slaughtering the swine is liable to result in poor marks and lost identity. The use of the tattoo instrument without pigment is of experimental rather than practical interest, and when large numbers of hogs are tattooed in that manner by the average operator there are likely to be many cases of doubtful or lost identity.

For the convenience of the operator, it is desirable to have a small carrying case to accommodate the desired number of tattooing

blocks, can of enamel, brush, notebook, pencil, and a small bottle of turpentine and a cloth for removing any enamel that may get on the hands during the work. Such a case makes work on farms and in stockyards more systematic and eliminates the rather precarious practice of carrying the sharp-pointed tattooing blocks in one's pockets.

METHOD OF USING THE MARKER

The tattoo mark is applied merely by striking the hog smartly with the instrument. (Fig. 5.) Packing companies prefer that tattoo marks be placed at the top of the shoulder slightly to one side of the backbone so that the marks will not be interfered with when the carcass is split. This particular section of the hide is cut out

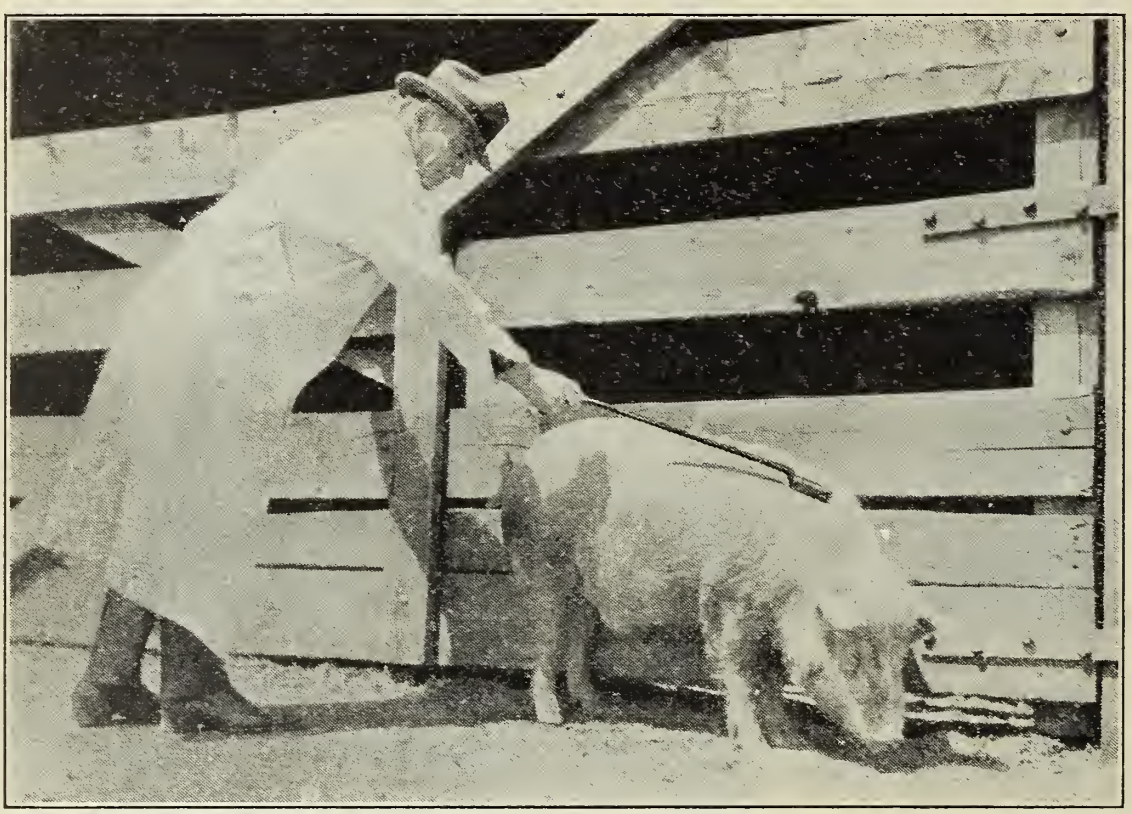

FIG. 5.—Applying the tattoo mark to a hog. The operation is performed by striking the hog smartly with the tattoo instrument

in the trimmings. Shoulders, hams, sides, and backs should not be disfigured with any foreign marks or brands. The market trade is skeptical of marks on pork products other than packers' brands and the official stamps of inspectors. The process of tattooing becomes rapid with practice and experience.

Because of the thickness of the hide and the underlying layer of fat which contains few nerve ends, the instrument appears to cause no pain. Some animals grunt or hump their backs slightly at the moment of tattooing, but in the experimental work very few hogs squealed, nor have any ill effects resulted from the tattooing of approximately 8,000 head of swine.

Developments in the use of the marker on all kinds of hogs, ranging from pigs to old boars, show the desirability of judgment in the force used for applying the tattoo. A boar, having a thick, tough hide, naturally should be struck considerably harder than a young hog having a thinner and more tender skin. With practice the

operator soon learns to strike hard enough to cause the tattooing points to penetrate the skin but not enough to cause a bruise. It should be remembered that the instrument is a marking device and not a club.

Experience shows also that letters and figures of unmistakable clearness are more desirable for tattooing purposes than those which may possibly be confused. For instance, a 6 and a 9 resemble each other when in an inverted position; consequently 68 might be mis-

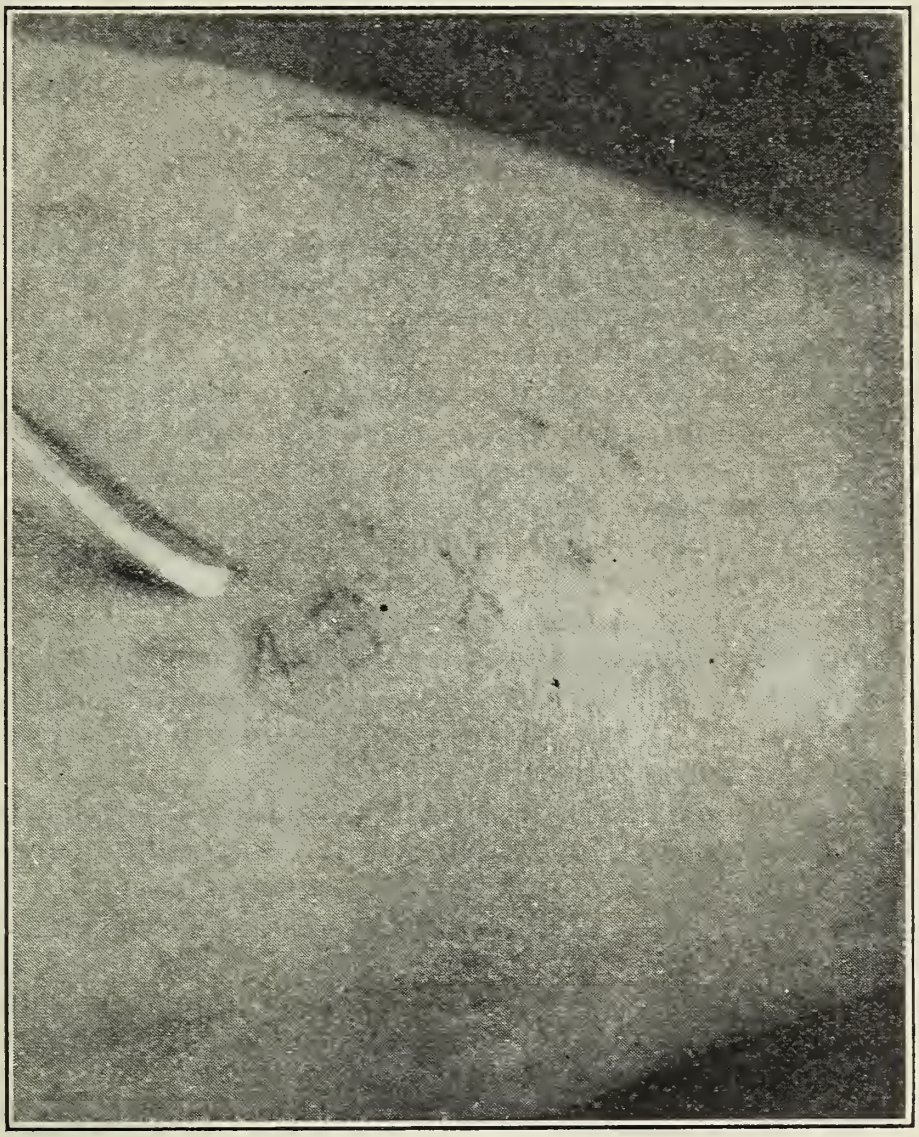

FIG. 6.—The mark may be easily seen 10 feet away. Neither the hair nor the scurf interferes with the application of the tattoo mark

taken for 89. Similarly the letter C resembles an O somewhat. It is therefore best to select letters and figures as distinct as possible from one another for use in marking different lots of hogs in a shipment.

The same method is used for all colors and breeds of hogs, since the dressed carcasses of all are white or nearly so. Occasionally some carcasses are pink, slightly dark, or mottled, but the tattoo mark properly applied is plainly visible in all cases.

Though the instrument used in tattooing is practically indestructible, the points sometimes become bent and need straightening. For this purpose a small, flat file serves both for pressing them into

an upright position and for sharpening dull points. The principal precaution is not to drop the instrument on a concrete floor or other hard surface.

A matter which has received comment from persons interested in the use of the tattooing instrument is the appearance of the marks on the dressed carcasses. (See fig. 6.) Although the tattoo figures can be read 10 feet away, they are by no means unsightly and have caused no criticism or adverse comment from any branch of the livestock industry or meat trade. Inquiry on this subject among various branches of livestock trade, including buyers, commission men, and packers has failed to reveal any objection to the marks when properly placed above the shoulders slightly to one side of the median line.

USE IN DISEASE-CONTROL WORK

In recent years a considerable proportion of the hogs slaughtered under Federal supervision fail to pass inspection. Tuberculosis is the principal cause for condemnations, with hog cholera and numerous other diseases and conditions contributing to the large total. Naturally the first step toward eradicating a disease is to discover the cause or source and then remove it, so far as possible. Extensive field investigations reveal that hogs contract tuberculosis largely from feeding behind tuberculous cattle, drinking infected skim milk, feeding on diseased carcasses (including those of tuberculous fowls), and the use of infected garbage as feed. In dealing with hog cholera and other diseases that spread rapidly, much of the success of control work depends on promptness in finding the centers of infection. The tattoo method of marking hogs for immediate slaughter is especially well adapted for establishing the origin of different lots, as will be seen from the following descriptions:

The first experiment in tattooing was made at a packing plant under Federal inspection in Ogden, Utah. Large numbers of hogs are hauled to this plant in motor trucks and wagons and are delivered at the scales in the yard. The plan of procedure was as follows: At the time of weighing, the man in charge of the scales applied a tattoo to each lot of hogs, giving each farmer a number or letter. The records showed date of sale, name and address of the producer, number of hogs marked, and the tattoo number.

When the carcasses came up before the post-mortem inspector, he noted on the form regularly used in making post-mortem reports (Form 112–F) the tattoo number of all hogs in which diseased conditions were found. This included carcasses either condemned or set aside under a "retained" tag for further examination. In the absence of a column on the form for noting the tattoo number the inspector made his notation on the margin or in the column marked "Sex," which afforded ample space for the additional information. From these killing-floor records, together with those made at the scales, it was a simple matter to trace the source of the diseased hogs. When an inspector went to each of the infected farms, he was in possession of this information: Producer's name and address; date of sale, number of hogs delivered, the tattoo number applied to that particular lot, number of hogs showing disease on post-mortem, the extent of the lesions, and the disposal of the carcasses.

When the disease was tuberculosis—as was usually the case—the first thing done was the testing of the cattle. Those reacting were slaughtered. If no reactors were found, then further investigation was made to determine the origin of the disease, the poultry flock receiving careful inspection. Minor tuberculous lesions in swine are frequently due to infected fowls. In each case everything possible was done to clear the farm of its infection.

In connection with eradication of bovine tuberculosis on a county-wide basis, the use of the tattoo marker is likewise important. It is desirable to obtain frequent post-mortem reports on the swine as a check on the health of the cattle and the poultry on the farm, hogs being susceptible to both bovine and avian tuberculosis.

During 1927 there was adopted for the Kansas City market a code system of marking hogs from counties accredited as free from bovine tuberculosis, so that regardless of origin no two lots of hogs would bear the same letters or numbers. Experience showed the advantage of using letters to designate the State, county, and shipper or shipping point. Numbers or letters are used to denote the separate owners in each collective shipment. For example, KNM is the code of the Melvern Shipping Association, at Melvern, Osage County, Kans. The first letter K represents the State of Kansas; the second letter N denotes Osage County, which was the fourteenth county in the State to be accredited, N being the fourteenth letter of the alphabet; the third letter M in the tattoo code represents the Melvern Shipping Association.

In the code of KNM4 the digit 4 may represent John Doe as the owner of a certain lot of hogs in the shipment. When hogs reach the shipping station of Melvern those of each owner are given a different number, as 1, 2, 3, 4, etc. All hogs owned by the same shipper, of course, bear the same mark. The tattoo marks recorded on a premium certificate which is presented to the packer-buyer immediately after the sale price of the hogs has been agreed upon. In case any hogs in the shipment are found to be tuberculous by the inspectors, a brief reference to the premium certificate easily determines the ownership.

This method of marking hogs for future identification has given complete satisfaction and has proved to be practical for the following reasons: (1) The information thus obtained is indisputable; (2) the marking is easily done; (3) the instrument and materials are inexpensive; and (4) the work takes but little time. The figures and letters, once applied, establish identity more permanently than tags or other devices that are merely attached to the animal.

From the results obtained thus far, the tattoo method appears to be the surest and quickest means of finding centers of infectious diseases.

EXAMPLES OF PRACTICAL APPLICATION

The tattoo method has the additional advantage of establishing a fair basis for compensation when mixed lots of hogs from several producers contain diseased animals.

The manner in which the tattooing of hogs led to the discovery of tuberculosis in a poultry flock in Michigan is of practical interest. In the course of investigational work a shipment of tattooed hogs

to a central marketing point proved to be infected with tuberculosis. An inspector visited the farm and applied the combination test (intradermic, using avian and standard tuberculin) to the remainder of the hogs on the farm, with the result that practically 100 per cent reacted to the avian test. The inspector also found the chicken flock to be badly infected.

On the inspector's recommendation, the owner sold his entire flock of chickens, restocking with day-old chicks the following spring. Later, 32 hogs from this farm were shipped to market and again identified by the tattoo mark. A report on 27 of these animals showed that not one had been found infected; the remainder were not slaughtered under Federal inspection and a report on them could not be obtained. It was reasonably apparent that the tracing of the disease, slaughter of the infected flock, cleaning, disinfection, and restocking with healthy chicks had removed the source of infection.

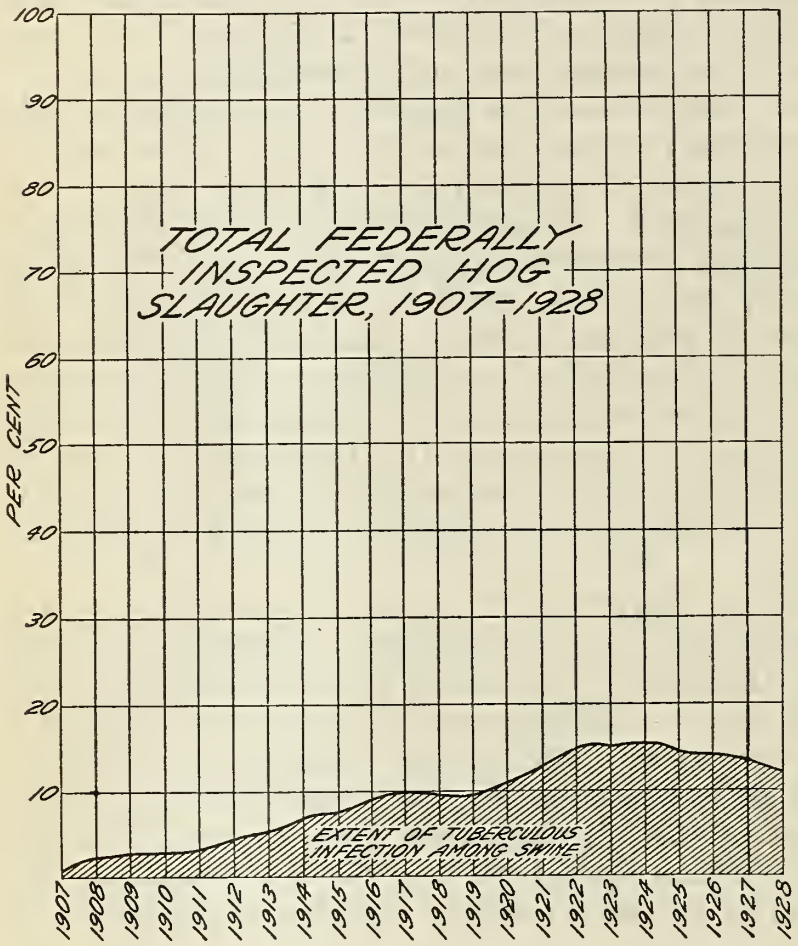

FIG. 7.—Evidence of extensive tuberculosis infection among swine 'retained' on account of tuberculosis (fiscal years 1907 to 1928, inclusive), where Federal meat inspection is maintained. The extent of the disease finally determines whether carcasses are condemned wholly or in part. The tattoo method should reduce this infection

On a subject as new to the livestock industry as the tattoo method here described, opinions expressed concerning its possibilities naturally are conservative. But in this connection, the remarks of the manager of a packing house plant at Salt Lake City, Utah, where much of the experimental work was done, are of interest. This is a branch plant of one of the largest packing companies in the United States. Besides showing a sympathetic interest in the device, he referred to it as "a practical means of getting back to the place where the disease comes from, and of reducing infection on farms." He said:

It is possible to trace the source of range cattle by their brands, and we can often get the names and addresses of their original owners without much difficulty; but hogs lose their identity after slaughter so easily that little has been done in a systematic way to stop the losses that we find are becoming very heavy. We purchase hogs with the expectation of losing a certain per cent through condemnation, but even then a packer suffers a loss year after year, and until now I have seen no practical way to eliminate it. The economy in

the operation of the tattoo device is a very strong point in its favor. This should prove helpful in introducing it in connection with stockyard work.

The increasing prevalence of tuberculosis among swine is noticeable, even though the increase has been gradual, and it is a problem which must be met and dealt with vigorously. As packers we are naturally interested in any practical means of getting results. But the question of eliminating the burdensome losses is one that should also interest the public. Success in reducing disease on farms will be a great public benefit.

As shown in Figure 7, which is based on meat-inspection records, the number of swine affected with tuberculosis has exceeded 10 per cent for a considerable period of years, and the situation has other important aspects. The foregoing instances, showing the use of the tattoo device, give promise of a means for checking and finally reducing the very serious losses from this cause.

WIDE FIELD OF OTHER USES

The results that have been obtained from the use of the tattooing method suggest further possibilities covering a wide field. The same means of tracing diseases is suitable for discovering the source of internal and external parasites. The presence of destructive parasites in a shipment of hogs is sometimes evidence that other stock on the farm of origin may likewise be affected.

During outbreaks of animal diseases, when exposed animals are ready for market and are to be sold subject to inspection, the practice of tattooing should be an effective means of identifying shipments and of tracing the extent and course of infection through a region. This comment applies especially to outbreaks of hog cholera, foot-and-mouth disease, and hemorrhagic septicemia. There appear to be wide possibilities for use also in the preparation of biological products, such as viruses and serums, where positive identification of the source of the products is essential. Its use has been suggested also in locations where the stealing of hogs may occur, thus giving a definite means of identification.

During the last few years the tattooing of hogs has been especially useful as a means of determining the presence of avian tuberculosis on farms. Swine raised on farms containing tuberculous poultry flocks generally show characteristic tuberculous lesions. Especially when the cattle of the area have been tuberculin tested and found free from the disease, the evidence of infection in swine indicates still more strongly the probability of tuberculous fowls on the premises.

The tattoo should be of aid likewise in studying results of feeding tests, in contests of various kinds, such as the familiar ton-litter competitions, and in similar activities where facts concerning the size and quality of carcasses are desired. In fact, any experimental work involving studies of dressed carcasses offers a wide field for the use of tattoo marks.

The use of the tattoo instrument has proved to be valuable in several swine investigations conducted by the United States Department of Agriculture and various States dealing especially with the soft-pork problem. Swine fed various rations when finally slaughtered were readily identified by the tattoo mark applied early in the course of the feeding experiments.

E. Z. Russell, animal husbandman in charge of the bureau's swine investigations, reports the successful use of the tattoo instrument in

a variety of experiments concluded by the slaughter of the hogs. The time elapsing between tattooing and slaughter varied from 7 to 114 days; the number of hogs ranged from a few head to as many as 242. In all cases the marks showed plainly on the dressed carcasses.

Numerous opportunities for use in cooperative marketing present themselves. Aside from the aspects of animal health, the tattoo mark is a convenient means of identification for establishing the original ownership of dressed hogs.

The tattoo instrument is a product of investigations by the Salt Lake City office of the Bureau of Animal Industry. Its use thus far has been chiefly in livestock sanitary work, the first public discussion concerning it having occurred at a conference of State and Federal livestock sanitary officials in Chicago, October 8, 1919.

Costs for making the holder and about 12 blocks containing the tattoo points, with a few blanks, have ranged from $10 to $15 for a complete outfit. This represents handwork on individual outfits, made in a small shop. More recently tattooing devices have been made to sell for less.

The writer requests that persons using the tattoo marker notify the Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C., of their activities in this field. The method of use and results obtained will be a useful contribution to data on the subject.

CONCLUSIONS AND SUMMARY

The tattoo method of marking hogs for purposes of identification after slaughter is a modern application of an age-old system for marking the human body.

Properly applied, the tattoo mark is permanent and is clearly visible on the dressed carcasses of hogs even though applied several months before their slaughter.

A marking fluid composed of linseed oil (raw preferred), or cylinder oil, mixed with lampblack to a siruplike consistence is a convenient and satisfactory tattooing fluid. It is applied to the needles of the tattooing instrument with a brush.

The form of instrument considered most suitable for tattooing hogs consists essentially of a metal holder about 18 inches long, slotted to receive five small blocks of Babbitt metal in which phonograph needles are embedded with the points protruding about a quarter of an inch. The needles are arranged to form numbers and letters. In the use of the device the needles should enter the skin their entire length.

The device is particularly adapted for marking hogs, causing neither noticeable pain nor discomfort; but it is not recommended for marking other classes of livestock.

Extensive tests have demonstrated the practicability of the device in tracing the origin of animal diseases and in identifying the ownership of diseased animals in mixed shipments.

Numerous other practical uses of the device suggest themselves, such as tracing the source of animal parasites, experimental work involving the study of dressed carcasses and identifying ownership in cooperative marketing, in cases of stolen hogs, and otherwise.

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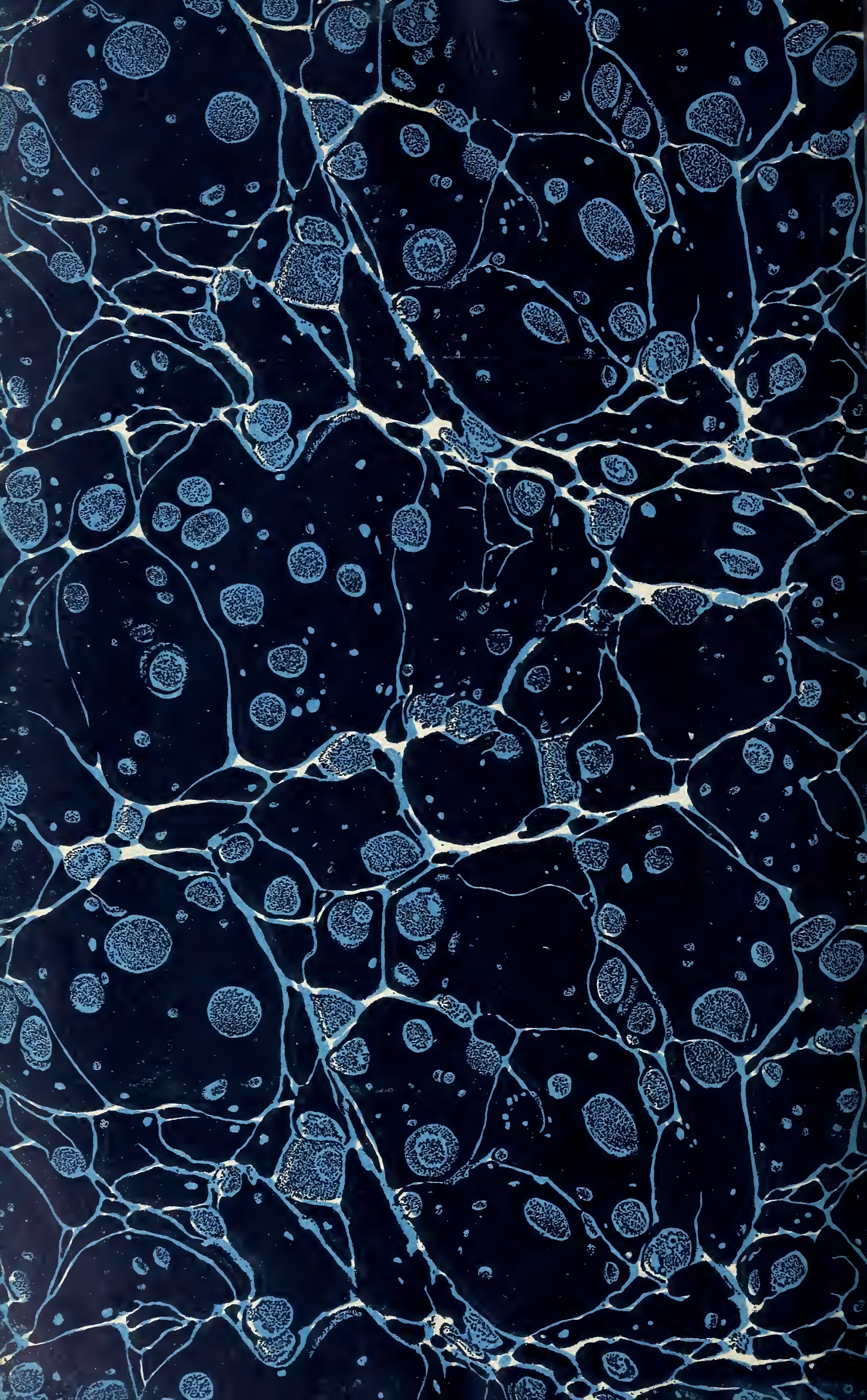

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